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## A new genus for the Mongolian Finch *Bucanetes mongolicus* (Swinhoe, 1870)

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The so-called 'desert finches' represent a generally recognised, if only broadly aligned, grouping of four species found in the Western Palearctic and Western and Central Asia. They are: Crimson-winged Finch *Rhodopechys sanguineus* (Gould, 1838) of north-west Africa (*R. s. alienus* Whitaker, 1897) and Turkey and the Levant east to Central Asia (*R. s. sanguineus*); Desert Finch *Rhodospiza obsoleta* (Lichtenstein, 1823) in the Levant east to Inner Mongolia (monotypic); and the two species of 'trumpeter' finches, Trumpeter Finch *Bucanetes githagineus* (Lichtenstein, 1823), which comprises four subspecies found discontinuously from the Canaries to Central Asia and north-west India, and Mongolian (Trumpeter) Finch *B. mongolicus* (Swinhoe, 1870) of Turkey east to western China (monotypic). The genera *Rhodopechys* Cabanis, 1851, and *Rhodospiza* Sharpe, 1888, are rarely challenged in the most-modern literature (the use of all three genera was first widely promulgated by Hartert & Steinbacher 1938), although Desert Finch, the sole representative of the latter genus is sometimes regarded as a constituent of *Rhodopechys* (see below). Of particular debate is the generic assignment of the other two species, which is further discussed here. It has recently been suggested that *Rhodopechys sanguineus alienus* might represent a phylogenetic species, distinct from nominate *sanguineus* (Fry & Keith 2004). As is partially visible in the accompanying photos, the two are rather distinct in adult male plumage and GMK, at least, favours the theory that the two are probably allospecies (Kirwan &

Atkinson in prep.). This issue is beyond the scope of the present contribution, however, and will be addressed elsewhere.

### Treatment in the literature

As part of an ongoing field, museum and literature study into the distribution and taxonomy of Turkish birds (Kirwan *et al.* in prep), the first-named author revisited the question of the most appropriate genus in which to treat the two species of 'trumpeter' finches. Two existing options appeared available, to consider them both as *Bucanetes* or to subsume them, and perhaps *Rhodospiza*, within *Rhodopechys*. Initially, he took a sample of some of the existing and more modern literature, including field guides. Literature was solely selected on the basis of material available in his library that covered at least three of the four species, and which did not strictly follow another previously accessed source for taxonomy and nomenclature. Eleven publications treated all of the 'desert finches' within an expanded *Rhodopechys* (Vaurie 1949, Ripley 1961, Vaurie 1972, Ali & Ripley 1974, Hue & Etchecopar, Cheng Tso-hsin 1987, Sibley & Monroe 1990, Clement *et al.* 1993, Sibley 1996, King 1997, Adamian & Klem 1999) and the others, 14, considered the group to comprise three genera (Voous 1977, Flint *et al.* 1984, Roberts 1992, Beaman 1994, Baumgart 1995, Roselaar 1995, Inskipp *et al.* 1996, Porter *et al.* 1996, Beaman & Madge 1998, Grimmett *et al.* 1998, Snow & Perrins 1998,

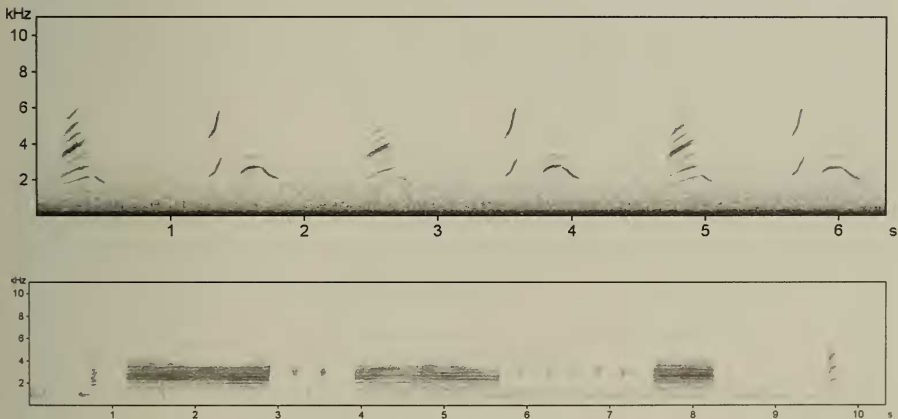


Figure 1. Sonograms of Mongolian Finch *Bucanetes mongolicus* (upper, recorded near Xining, Qinghai province, in western China, in June 1993, by Paul Holt, using a Sony TCM 5000EV cassette recorder, Sennheiser ME88 + pre-amp.), and Trumpeter Finch *B. githagineus* (lower, recorded near Ouarzazate, Morocco, in March 1978, by Claude Chappuis, using a Grampian DP microphone, Nagra SN tape-recorder and parabola). Sonograms prepared by Richard Ranft (The British Library National Sound Archive, London, UK) using Avisoft software, with standard default settings. Recordings © of the recordists.

Svensson *et al.* 1999, Dickinson 2003, Fry & Keith 2004). From this, distinctly unscientific but probably broadly accurate sampling of the different treatments, it seemed that there was an increasing tendency for the four species to be treated in three genera, and therefore for *Bucanetes* and *Rhodospiza* to be recognised. (It should be noted that if included within *Rhodopechys*, the specific name of the Mongolian Finch remains *mongolicus*, whilst if treating Trumpeter Finch similarly its name must be spelled *githagineus*: David & Gosselin 2002, and not as in Howell *et al.* 1968).

### The relationship of *B. mongolicus* to *B. githagineus*

Although generally accorded specific status, Mongolian Finch was considered a subspecies of Trumpeter Finch by Dementiev & Gladkov (1966–70) and Cheng Tso-hsin (1976, 1987), an arrangement that is clearly untenable given the suggestion of Panov & Bulatova (1972) that *mongolicus* is more closely related to Scarlet (Common) Rosefinch *Carpodacus erythrinus*, and, even more importantly, because the two are broadly sympatric without interbreeding (e.g. Vaurie 1949). East in Asia, *mongolicus* and *githagineus* are also apparently altitudinally segregated (Haffer 1989), but further west, e.g. in Turkey and the Caucasus, they have been, at least occasionally, recorded in total sympatry (see Roselaar 1995, Kirwan *et al.* 2003), and some evidence of character displacement has been noted (in greatest detail by Panov & Bulatova 1972), which is a phenomenon frequently observed among relatively closely related species in areas where they overlap. They also differ markedly in vocalisations, see Fig. 1 for sonograms of their principal songtypes. Given such striking differences in the latter, we (like others) prefer to drop the 'trumpeter' modifier from the vernacular name of *B. mongolicus*.

With hindsight, in some respects it was rather perceptive of Swinhoe to have described Mongolian Finch within *Carpodacus* given that the species' coloration and behaviour, especially courtship, shows much greater similarity with the latter genus than to the other *Bucanetes* (GMK pers. obs.). Cabanis (1851) described the genus *Bucanetes* thus (translated from the German): 'Satisfactorily distinguished from *Carpodacus* by the longer, more pointed wing and the shorter tail, as well as by the less broad bill, tighter feathering and coloration'. In some of these characters, *B. mongolicus* also differs from *Carpodacus*, but clearly, as the characterisation of a genus, such a description leaves much to be desired and does not provide compelling rationale for the inclusion of other species taxa therein. Additionally, E. N. Panov (*in litt.* 2003) and Panov & Bulatova (1972) reported that unpublished work on the vocalisations of *C. erythrinus* and *B. mongolicus* also appears to support the idea of a close relationship between the two. To transfer either of the two 'trumpeter finches' to *Carpodacus* (as was done by Ripley 1982) is unsupported by all of the available evidence, although the caryotypes (Panov & Bulatova's work somewhat pre-dates currently fashionable DNA analyses) of *mongolicus* and *erythrinus* are rather similar and both differ more significantly from *githagineus*



Figure 2 (top). Specimens of 'desert finches' (from top to bottom): Crimson-winged Finch *Rhodopechys sanguineus alienus*, Red-browed Finch *Callacanthis burtoni*, and Crimson-winged Finch *R. s. sanguineus* (Guy M. Kirwan, © the Natural History Museum, Tring)

Figure 3 (bottom). Desert Finch *Rhodospiza obsoleta* (top) and Trumpeter Finch *Bucanetes githagineus zedlizi* (Guy M. Kirwan, © the Natural History Museum, Tring)





Figure 4 (top). Dorsal views of the same specimens as in Fig. 3 (Guy M. Kirwan, © the Natural History Museum, Tring)

Figure 5 (lower). Mongolian Finches *Bucanetes mongolicus* (lower two birds) and Trumpeter Finches *B. githagineus* (Guy M. Kirwan, © the Natural History Museum, Tring)

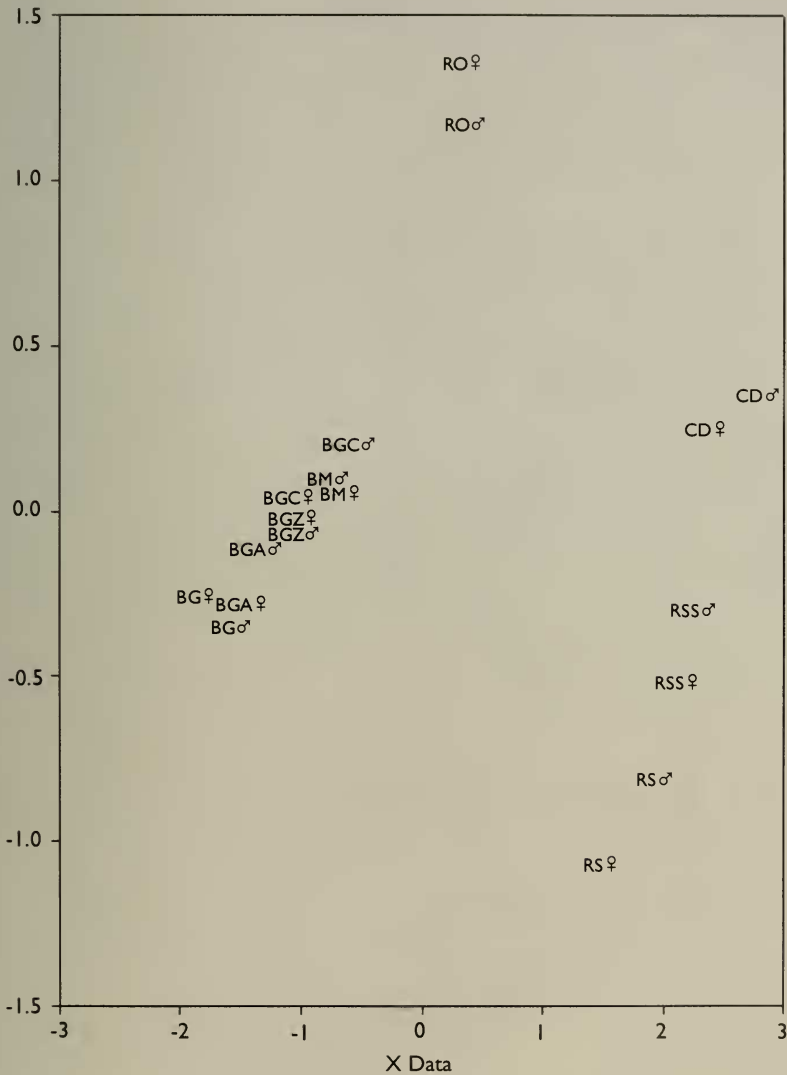


Figure 6. Results of a Principal Components Analysis for wing, tail and bill (culmen) lengths of all taxa of 'desert finches' plotted two dimensionally. BG = *Bucanetes githagineus githagineus* (12 males, three females), BGA = *B. g. amantum* (seven males, seven females), BGC = *B. g. crassirostris* (11 males, ten females), BGZ = *B. g. zedlitzii* (20 males, three females), BM = *B. mongolicus* (26 males, 16 females), CB = *Callacanthus burtoni* (nine males, eight females), RO = *Rhodospiza obsoleta* (14 males, eight females), RS = *Rhodopechys sanguineus sanguineus* (19 males, eight females), and RSA = *R. s. alienus* (seven males, five females).

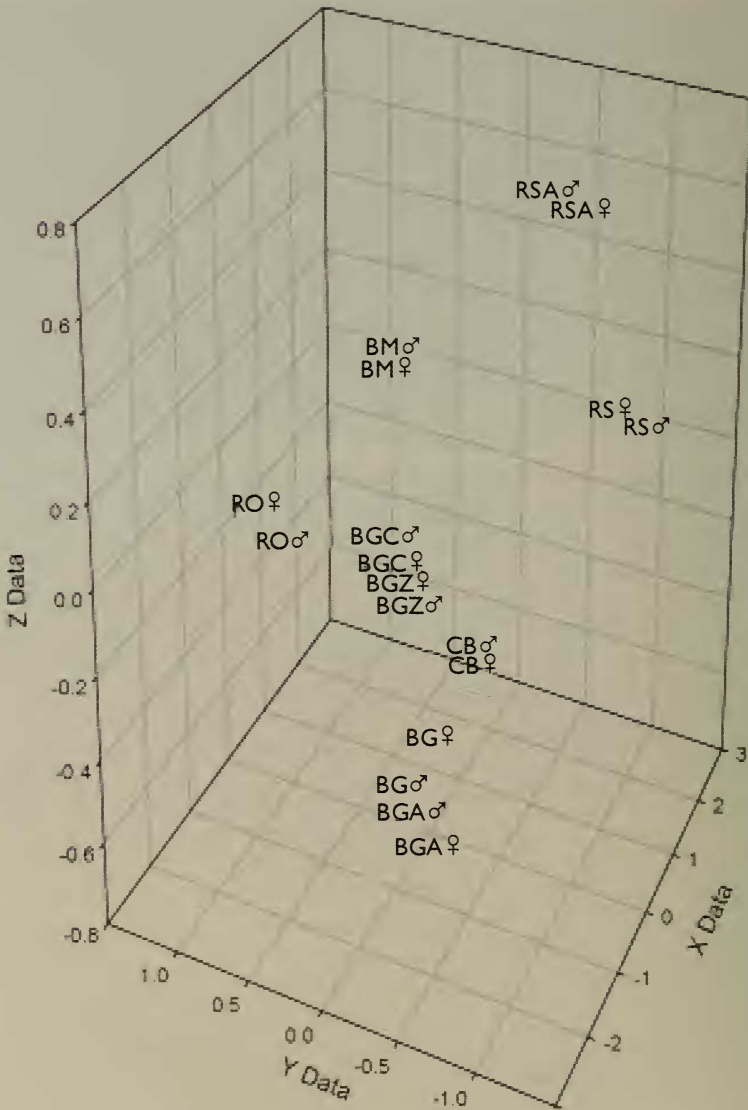


Figure 7. Results of a Principal Components Analysis for wing, tail and bill (culmen) lengths of all taxa of 'desert finches' plotted three dimensionally. BG = *Bucanetes githagineus githagineus* (12 males, three females), BGA = *B. g. amantum* (seven males, seven females), BGC = *B. g. crassirostris* (11 males, ten females), BGZ = *B. g. zedlitzii* (20 males, three females), BM = *B. mongolicus* (26 males, 16 females), CB = *Callacanthis burtoni* (nine males, eight females), RO = *Rhodospiza obsoleta* (14 males, eight females), RS = *Rhodopechys sanguineus sanguineus* (19 males, eight females), and RSA = *R. s. alienus* (seven males, five females).

than from each other, and thus we do not favour the option of subsuming *mongolicus* alone within *Carpodacus* (as proposed by Panov & Bulatova 1972), because of the obvious and highly significant outward (i.e. morphological) differences between them. In some respects, Mongolian Finch shares several morphological characteristics with both Crimson-winged and Desert Finches (see Figs. 2–4). Indeed, Mongolian Finch's unequivocal discovery in the Western Palearctic, in Turkey, was complicated by chronic confusion with both these other species (see Barthel *et al.* 1992, Kirwan & Konrad 1995, Kirwan *et al.* 2000).

Given the findings of Panov & Bulatova (1972), to view the genus *Bucanetes* as monophyletic clearly becomes untenable, but at present few other options for its systematic placement exist. As noted above, both species of *Bucanetes* have been considered within an expanded *Rhodopechys*, along with *R. sanguineus* and *Rhodospiza obsoleta* (see e.g. Vaurie 1949, Cheng Tso-hsin 1987, Sibley & Monroe 1990, Clement *et al.* 1993; equally, some have viewed all four species within *Bucanetes*, although, from a nomenclatural standpoint, this runs *contra* to the principle of priority). Such an arrangement, whilst possessing some obvious advantages and clearly supported by a number of shared morphological, behavioural and other characteristics, also has significant negative results. For *Rhodopechys* cannot really be viewed as a natural or monophyletic grouping either, all four species are significantly different in many respects, and diverge more subtly in others (e.g. their breeding biologies; see Harrison & Castell 2001). Furthermore, Crimson-winged Finch appears to be most closely related to Red-browed (Spectacled) Finch *Callacanthis burtoni*, a monotypic genus found in the Himalayas, which in turn is most closely allied to the rosefinches and the *Acanthis* group (subgenus) of *Carduelis* (C. S. Roselaar in Cramp & Perrins 1994), and these two may prove to be congeners (as, indeed, they were treated by Ripley 1982). The eggs of *Rhodopechys sanguineus* and *Callacanthis* are remarkably similar, but differ from those of *Bucanetes* and *Rhodospiza*, which three species are generally rather similar (M. P. Walters unpubl. ms.), although their choices of nest location are quite different (Harrison & Castell 2002). Further, Desfayes (1969) demonstrated that *Bucanetes* and *Rhodopechys* are probably not close relatives. Thus, an expanded *Rhodopechys* appears to be a 'catch-all' option for taxa whose relationships are sufficiently enigmatic to defy easy categorisation and are not necessarily congeneric (as was done for many years with a number of African sunbirds; see Irwin 1993, 1999). All of the principal taxa involved, including *Callacanthis burtoni*, are depicted in Figs. 2–5.

### **Intra-group relationships based on mensural data**

GMK, with the assistance of Phil Atkinson, tested the relationships of all taxa within the 'desert finches' grouping based on an analysis of mensural data. These were taken from specimens held at the Natural History Museum, Tring, involving the following samples: *Callacanthis burtoni* (Punjab and north-west India: N=17,



TABLE 1

Means  $\pm$  SD and sample sizes for wing, tail and bill measurements of the 'desert finches', based on specimens held in the Natural History Museum (Tring). BGG = *Bucanetes githagineus githagineus*, BGA = *B. g. amantum*, BGC = *B. g. crassirostris*, BGZ = *B. g. zedlitzii*, BM = *B. mongolicus*, CB = *Callacanthus burtoni*, RO = *Rhodospiza obsoleta*, RS = *Rhodopechys sanguineus sanguineus*, and RSA = *R. s. alienus*. Any specimen for which one or more dataset could not be measured was excluded from the analysis and table.

	Females				Males			
	Wing (mm)	Tail (mm)	Bill (mm)	N	Wing (mm)	Tail (mm)	Bill (mm)	N
BGG	79.33 $\pm$ 1.15	50.33 $\pm$ 0.58	10.23 $\pm$ 0.81	3	83.33 $\pm$ 2.67	51.58 $\pm$ 2.39	10.31 $\pm$ 0.43	12
BGA	80.14 $\pm$ 2.34	51.14 $\pm$ 2.04	10.87 $\pm$ 0.31	7	82.43 $\pm$ 1.51	53.14 $\pm$ 2.27	10.79 $\pm$ 0.52	7
BGC	83.6 $\pm$ 2.88	54.4 $\pm$ 2.63	10.41 $\pm$ 0.47	10	87.18 $\pm$ 2.32	57.27 $\pm$ 4.13	10.80 $\pm$ 0.28	11
BGZ	83.67 $\pm$ 1.53	54.00 $\pm$ 1	10.50 $\pm$ 0.46	3	85.75 $\pm$ 1.59	54.65 $\pm$ 3.23	10.47 $\pm$ 0.31	20
BM	86.94 $\pm$ 1.69	55.75 $\pm$ 3.71	10.17 $\pm$ 0.59	16	88.77 $\pm$ 1.88	56.65 $\pm$ 3.14	10.07 $\pm$ 0.52	26
CB	94.44 $\pm$ 1.24	64.50 $\pm$ 3.89	15.25 $\pm$ 0.84	8	98.94 $\pm$ 1.84	67.11 $\pm$ 3.18	15.38 $\pm$ 0.46	9
RO	84.13 $\pm$ 1.64	64.25 $\pm$ 3.81	11.66 $\pm$ 0.46	8	86.36 $\pm$ 1.91	64.21 $\pm$ 3.62	11.79 $\pm$ 0.58	14
RS	99.38 $\pm$ 1.85	56.63 $\pm$ 2.56	13.64 $\pm$ 0.92	8	104.05 $\pm$ 2.59	60.26 $\pm$ 3.26	13.76 $\pm$ 0.65	19
RSA	102 $\pm$ 1.87	61.40 $\pm$ 1.14	13.60 $\pm$ 0.43	5	105.57 $\pm$ 2.76	64.00 $\pm$ 1.15	13.30 $\pm$ 0.4	7

including nine males); *Rhodopechys sanguineus* (Armenia, Syria, Iran, Turkey, Lebanon, Kazakhstan and Samarkand: N=30, including 22 males); *R. s. alienus* (Moroccan Atlas: N=13, including seven males); *Bucanetes mongolicus* (China, Central Asia and Afghanistan: N=44, including 27 males); *B. g. githagineus* (all Egypt: N=15, including 12 males); *B. g. zedlitzii* (Morocco, Algeria and Tunisia: N=24, including 20 males); *B. g. amantum* (Canaries: N=16, including eight males); *B. g. crassirostris* (Punjab and Sind: N=21, including 11 males); and *Rhodospiza obsoleta* (Central Asia: N=22, including 14 males). Specimens were generally sexed according to label data, but these were checked against the literature in the case of suspect identifications. The following data were obtained from each specimen: wing-chord (flattened), tail length and culmen length (to skull), using a standard metal wing-rule with a perpendicular stop at zero (accurate to 0.5 mm), and dial callipers (accurate to 0.1 mm). Specimens for which an incomplete series of mensural data was available were excluded from the statistical analysis.

A Principal Components Analysis (PCA) was performed on the net data, and the results mapped on both two-dimensional (Fig. 6) and three-dimensional plots (Fig. 7). The two-dimensional plot confirmed that (as is well known for these taxa) males are generally larger than females, and further revealed that *Rhodospiza obsoleta*, *Callacanthus burtoni*, *Rhodopechys sanguineus* and *R. s. alienus* are all rather well-differentiated taxa, with the two-dimensional plot also revealing the close relationship that has been suggested between *Callacanthus* and *Rhodopechys*, but the situation surrounding the two *Bucanetes* is rather more complex, although bill morphology and overall size appear to separate the two species. The three-dimensional plot more clearly separates the two *Bucanetes* species, but reveals a

close relationship between the different subspecies of *githagineus* (as would be expected).

The PCA results also revealed the marked separation between *Rhodopechys sanguineus* and *R. s. alienus*, which will be discussed elsewhere (Kirwan & Atkinson in prep.).

## Genus-group nomenclature

Before progressing to any conclusion, we present an updated synonymy of the genus-group names under consideration, including that for Red-browed (Spectacled) Finch, *Callacanthis*.

### *Callacanthis*

*Callacanthis* Reichenbach, 1850. Avium Systema Naturale, [100 plates of generic details], Section 6, Insessores Eucleatores, pl. lxxviii.

Type by subsequent monotypy, Bonaparte, 1850, Conspectus Generum Avium, 1, p. 507., *Carduelis burtoni* Gould, 1838.

Section 6 of Reichenbach's generic details has been dated 1 June 1850 by Meyer (1897: vi), with no current evidence to the contrary, whereas livraison 64 of Bonaparte's work bears the printers date of 30 August 1850, and is considered by most commentators to have been issued during December 1850.

*Burtonia* Bonaparte, 1850. Conspectus Generum Avium, 1, p. 507.

Type by virtual tautonymy, *Burtonia erythrophrys* (Blyth, 1846) = *Carduelis burtoni* Gould, 1838.

### *Rhodopechys*

*Rhodopechys* Cabanis, 1851. Mus. Heineanum, 1, p. 157, fn.

Type by original designation, *Fringilla sanguinea* Gould, 1838 (1837).

### *Bucanetes*

*Bucanetes* Cabanis, 1851. Mus. Heineanum, 1, p. 164.

Type by subsequent designation, G. R. Gray, 1855, Cat. Genera Subgenera Birds, p. 81. *Pyrrhula payraudaei* Audouin, 1825 = *Fringilla githaginea* M. H. K. Lichtenstein, 1823.

Cabanis originally included two species, therefore type 'by monotypy' as cited by Howell *et al.* (1968: 263) is incorrect.

### *Rhodospiza*

*Rhodospiza* Sharpe, 1888. Cat. Birds Brit. Mus., 12, p. 282.

Type by monotypy, *Fringilla obsoleta* M. H. K. Lichtenstein, 1823.

From the above, it is self-evident that *Rhodopechys* Cabanis, 1851, has page priority over *Bucanetes* Cabanis, 1851, as the senior name for the 'desert finches' if all four species are considered congeneric, and this, indeed, has long been accepted as the

case. Should, however, *Callacanthis burtoni* (Gould, 1838) also be included then *Callacanthis* Reichenbach, 1850, would have seniority.

### A new genus for *mongolicus*?

It seems entirely plausible to us that each of the four species included within *Rhodopechys* by, e.g., Sibley & Monroe (1990) warrants separate generic allocation, and it is surely significant to note that no less a commentator than Voous (1977) struggled with the systematic position of many of the carduelines, he being forced to acknowledge the striking distinctiveness and the lack of obvious relationships of a number of taxa. We recommend that all four of these 'desert' finches and *Callacanthis* be subject to DNA analysis in order to more clearly define their relationships. As can be seen from the synonymy, no generic name currently exists to serve for a monotypic *mongolicus*. Sharpe (1888: 284) included both 'trumpeter' finches within *Erythrospiza* (Bonaparte; *Bp. Faun. Ital.*, Ucc. Pl. 35 fig. 3 [1832–41]), but as was shown by W. L. Sclater (1926: 130) Bonaparte introduced this name earlier, in 1831, with G. R. Gray's (1840: 48) designation of *Loxia erythrina* Pallas, 1770, as the type, precluding *Erythrospiza* from being the generic name for any of the 'desert finches' (Howell *et al.* 1968: 267).

In our opinion, until such time as it becomes possible to conduct a detailed and robust molecular analysis of these and other outlying taxa, it seems logical either to treat all of the four species of 'desert finches' within their own monotypic genera or to include all within *Rhodopechys*, almost certainly expanded to incorporate *Callacanthis*. If the former, then the relationship of *mongolicus* to those species traditionally included within *Carpodacus* requires further evaluation. P. C. Rasmussen (*in litt.* 2003) notes that *Carpodacus*, as currently understood, also appears to represent a non-monophyletic assemblage, and therefore demands revision. We therefore anticipate the need for an exclusive generic name for the Mongolian Finch, and propose here:

### *Eremopsaltria*, gen. nov.

Type Species: *Carpodacus mongolicus* Swinhoe, 1870. Proc. Zool. Soc., London, p. 447.

Etymology: Greek ἔρημία *eremia*, desert, and ψάλτρια *psaltria*, female lyre-player, singer.

Gender: feminine.

Monotypic.

New Combination:

*Eremopsaltria mongolica* (Swinhoe, 1870).

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